REMARKS/ARGUMENTS

By the present Amendment, claims 1-9, 11-13 and 17-19 are pending in this application. Claim 10 is canceled without prejudice. Claims 14-16 have been withdrawn as being drawn to non-elected subject matter. Applicants reserve the right to file one or more continuation, continuation-in-part, or divisional applications towards any canceled or withdrawn subject matter. Claims 1-9 are amended herein. Claims 17-19 are added herein. Basis for these amendments and newly added claims may be found in the specification as originally filed. No new matter has been added.

Claim Rejections - 35 U.S.C. § 112, 2nd paragraph

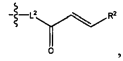
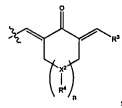
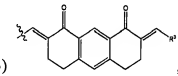
Claim 1 is rejected under 35 U.S.C. § 112, second paragraph as allegedly being indefinite for reciting the possibility of "O" for the variable X^1 in view of the absence of any indication on the electrical charge associated with the encompassed compounds. Claim 1 is amended herein to correct this typographical error. As amended, claim 1 recites "X^1 is C= or N=," which is consistent with the specification and previously presented claims.

Claim 4 is rejected under 35 U.S.C. § 112, second paragraph as allegedly being indefinite for reciting the term "abond" instead of "a bond." Claim 4 is amended herein to correct this typographical error. Applicants respectfully request reconsideration and removal of these rejections.

Claim Rejections - 35 U.S.C. § 112, 1st paragraph

Claims 1-13 are rejected under 35 U.S.C. § 112, first paragraph because the specification, while being enabling for chalcone compounds containing boronic acid functionality, allegedly does not reasonably provide enablement for the overabundance of structural possibilities claimed when L^2, L^3, L^4 and L^5 are as described. Limiting L^2, L^3, L^4 and L^5 to double bonds would allegedly overcome this rejection. Applicants respectfully disagree.

It is respectfully submitted that as amended herein, the specification provides sufficient enablement for one of ordinary skill in the art to make and use the claimed compounds without undue experimentation. However, while not necessarily agreeing with the above characterization of the instant claims but in the interest of furthering prosecution of the application to grant of a U.S. patent, the claims have been amended herein to encompass compounds wherein R^1 has formula:

(1)  , (2)  , or (3)  ,

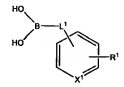
in which the ketone moiety of the variable R^1 and the double bond moieties of L^3, L^4 and L^5 are part of the Michael receptor structural moiety. When R^1 is moiety (1), (2) or (3), the specification provides sufficient enablement for one of skill in the art to make and use compounds having L^2 as a bond, substituted or unsubstituted alkylene, substituted or unsubstituted heteroalkylene, or substituted or unsubstituted heterocycloalkylene. Examples of the preparation of these compounds may be found in Examples 1-5 on pages 29 and 30; and in Figure 1 of the specification.

It is respectfully submitted that as amended herein, the specification provides sufficient enablement for one of ordinary skill in the art to make and use the claimed compounds without undue experimentation. Applicants respectfully request reconsideration and removal of these rejections.

Claim Rejections - 35 U.S.C. § 103

Claims 1-7 and 9-13 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Kumar et al. (Journal of Medicinal Chemistry 2003, 46(14), 2813-2815). Applicants respectfully disagree.

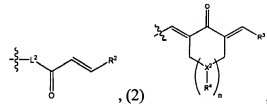
As amended herein, the invention as defined by the claims distinguishes over Kumar by claiming compounds having formula:



wherein X^1 is C= or -N=;

L^1 is a bond, substituted or unsubstituted alkylene, or substituted or unsubstituted heteroalkylene; and

R^1 has the formula:



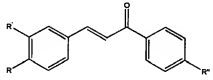
(1) , (2) , or (3) ,

wherein L^2, n, X^2, R^2, R^3, and R^4 are as described.

The claimed compounds, surprisingly, have significantly improved activity in inhibiting growth in human breast cancer cell lines than do the compounds of Kumar. In particular, the specification as originally filed provides the IC_{50} values for the growth inhibition of compounds 1 and 2 (shown in Figure 1) at paragraphs [0132], [0133] and Table 1 on pages 31 and 32. In the presence of compound 1, cell growth in the human cancer cell lines MDA-MB-231 and MCF-7 is inhibited as shown by the IC_{50} value of 1.0 μM. For compound 2, cell growth for these cell lines is inhibited as shown by the IC_{50} value of 1.3 μM and 1.9 μM, respectively. In contrast, the compounds of Kumar are less active in inhibiting cell growth in the human cancer cell lines MDA-MB-231 and MCF-7. As shown in Table 1 on page 2814 of Kumar, compounds 3a-3e and

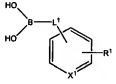
7 inhibit cell growth in the human cancer cell lines MDA-MB-231 and MCF-7 with an IC_{50} values ranging from 8.5-11 and 5.0-9.5, respectively.

Kumar does not teach or suggest any compounds having the level of activity of the instantly claimed compounds in inhibiting growth in human breast cancer cell lines. Thus, one of ordinary skill in the art have been motivated to modify the teachings of Kumar in order to arrive at the instant claims. Nor would one of ordinary skill in the art have any reasonable expectation of success in arriving at the claimed compounds, based on their own general knowledge or on what Kumar teaches. As discussed above, this reference teaches compounds 3a-3e and 7, which have formula:



wherein R, R' are as describe therein; and R" is $B(OH)_2$, or $OCH_2B(OH)_2$.

In contrast, the claimed compounds have formula:

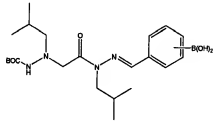


wherein X^1, L^1, and R^1 are as described above. The claimed compounds are not simply positional isomers of the compounds of Kumar. Instead, these compounds have unique structural features and unexpectedly greater inhibition activity in inhibiting human breast cancer cell lines.

For all these reasons, Applicants respectfully submit that the instant claims are not obvious over the teachings of Kumar. Reconsideration and withdrawal of this rejection is respectfully requested.

Claim Rejections - 35 U.S.C. § 102

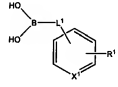
Claims 1-5, 9, 12, and 13 are rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Bouget et al. Biorganic and Medicinal Chemistry 11 (2003), 4881-4889. In particular, it is alleged that compound 11a (*o*-$B(OH)_2$), 11b (*m*-$B(OH)_2$), and 11c (*p*-$B(OH)_2$):



11a, b, c

anticipate the claimed compounds when X^1 is HC=; L^1 is a bond; and L^2 and L^3 of R^1 are heteroalkylenes further substituted with an alkyl (isopropyl) group. Applicants respectfully disagree.

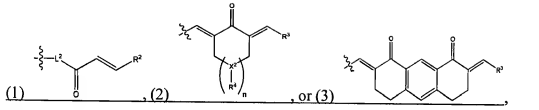
As amended herein, the invention as defined by the claims distinguishes over the cited reference by claiming compounds having formula:



wherein X^1 is C= or -N=;

L^1 is a bond, substituted or unsubstituted alkylene, or substituted or unsubstituted heteroalkylene; and

R^1 has the formula:



(1) , (2) , or (3) ,

wherein L^2, n, X^2, R^2, R^3, and R^4 are as described.

As described above, the instant claims have been amended to encompass compounds wherein the variable R^1 has formula (1), (2), or (3). As such, Bouget et al. does not anticipate the claimed invention. Applicants respectfully request reconsideration and withdrawal of this rejection.

Double Patenting

Claims 1-7 and 9-13 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as allegedly being unpatentable over claims 1-9 and 10-12 of copending Application No. 10/517,781, now U.S. Patent No. 7,514,579. It is alleged that the instant claims and the claims in the '579 patent are not patentably distinct from each other because the claims in the '579 patent have all the structural requirements present in the compounds of the instant claims, i.e. boronic acid group, ketone, and a linker moiety, except that the instant compounds are allegedly positional isomers with respect to the attachment of the ketone and boronic acid containing structural elements, which allegedly are obvious to one of skill in the art.

While not necessarily agreeing with the above characterization of the instant claims but in the interest of furthering prosecution of the application to grant of a U.S. patent, submitted herewith is a timely filed terminal disclaimer in compliance with 37 CFR 1.321(c). Applicants respectfully request reconsideration and removal of this rejection.

CONCLUSION

In view of the above amendments and remarks, reconsideration and favorable action on all claims are respectfully requested. In the event any matters remain to be resolved, the Examiner is requested to contact the undersigned at the telephone number given below so that a prompt disposition of this application can be achieved.

No fee is believed to be due in connection with the filing of this paper. However, the Commissioner is hereby authorized to charge any fees that may be required by this paper, or credit any overpayment to Deposit Account 07-1896 referencing the above-identified attorney docket number.

Respectfully submitted,

Date: December 11, 2009

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